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ABSTRACT

Semantic differential scales were used to collect data from 100 high school teachers representing eight area vocational-technical schools in Central Pennsylvania, in order to determine their attitudes toward classroom and nonclassroom instructional resources and to examine interrelationships among teacher attitudes toward resources and resource utilization and availability. Results indicated that the teacher group generally had a more favorable attitude toward "traditional" instructional resources as opposed to "progressive" materials. The traditional materials were also used more often and were more readily available. Relationships between attitude and use and between availability and use were generally positive and significant. Factor analysis of attitude variables revealed that teachers may view instructional resources in accordance with their personal involvement with resource preparation, selection, presentation, and application. The results indicate that preservice and inservice experience should be provided to acquaint teachers with new resources. (SB)

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INSTRUCTIONAL RESOURCES FOR
VOCATIONAL-TECHNICAL EDUCATION:
TEACHER ATTITUDE,
RESOURCE AVAILABILITY,
AND RESOURCE UTILIZATION

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assisted by
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SUMMARY

It was the purpose of this study to investigate the attitudes of vocational-technical teachers toward classroom and non-classroom instructional resources and to examine interrelationships among teacher attitude toward resources, resource utilization, and resource availability.

The sample consisted of one hundred high school vocational-technical teachers representing eight area vocational-technical schools in Central Pennsylvania. Five semantic differential scales were used to obtain attitudinal data. Each of the teachers responded to concepts consisting of terms relevant to the area of instructional resources. Data related to instructional resource availability and utilization were also obtained by means of semantic differential scales. Relationships among attitude, utilization, and availability were analyzed by means of correlational techniques. Partial correlations were computed in order that selected variables could be held constant and relationships assessed more meaningfully. An examination of instructional resource dimensions was conducted using the factor analytic method.

In all cases, resource availability was positively and significantly related to resource use. Teacher attitude toward each resource had little effect upon the availability-use relationship. Teacher attitude toward each particular resource was, for the most part, related to resource use in a positive and significant manner. Resource availability had a moderate reducing effect on attitude-use correlations for some resources.

Factor analysis of attitude variables indicated that teachers may view instructional resources in accordance with their involvement in resource preparation, selection, presentation, and application.

Analysis of attitude, use and availability variables suggested that teacher use as related to availability may be dependent upon whether the resource is of a "hardware" or "software" type. It appeared that teacher attitude toward one resource might reflect attitude toward many resources.

In recent years, numerous attempts have been made to improve instruction by means of behavior modification (Gage, 1963; Biddle, 1967). Unfortunately, many of these endeavors have not met with any great success. A primary reason for lack of success in behavior modification seems to stem from the idea that teachers change their ways of behaving easily and quickly. The premise that teacher behavior can be changed easily is, in fact, quite unrealistic. Teacher behavior is probably the most difficult component to modify in the entire educational system (Travers, 1962).

In contrast with modifying teacher behavior, several alternatives are available. For example, a decision may be made to hire only those teachers who display desirable behaviors. Unfortunately, however, it is difficult to identify personal attributes which relate to subsequent behavior (Samson, 1968). Additionally, teachers that are already employed in a school system greatly outnumber those being hired each year.

Another alternative to teacher behavior modification consists of instituting change within the instructional environment. This involves modification to the teacher's surroundings rather than to his or her behavior. More specifically, provision can be made for the availability of instructional resources which the teacher may utilize. As indicated by Popham (1969), "the educational reformer who eloquently urges classroom teachers to change their practices may receive the accolades of the education community, but the education reformer who provides a set of usable curriculum materials for the teacher is more likely to modify

what goes on in the classroom." In effect, meaningful application of instructional resources can make distinct contributions to the instructional process.

The contribution which resources can make applies equally well to vocational-technical shop or laboratory instruction as to classroom instruction. Within the area of vocational-technical education, there are numerous resources which could conceivably contribute to meaningful individual and group instruction. Indeed, because of emphasis on shop and laboratory based instruction, instructional resources have the potential to be used more intensely and extensively (Taylor and Christensen, 1967).

It should be noted, however, that potential resource use is not enough. Determination must also be made of the instructor's feelings about resources as related to the use which he will actually make of them. These questions and others which focus on teacher-resource relationships were examined as a part of the present study.

Related Research

A number of studies have been conducted which focus upon relationships between teacher variables, instructional resource availability, and resource utilization. Although the studies deal primarily with elementary and secondary instructors teaching general education courses, there does appear to be some relevance to the present investigation.

A study reported by the National Education Association (1967) was based upon information obtained from a sample of 1,609 teachers in school systems across the nation. The survey indicated that teachers have many instructional resources available for use in the classroom

and are making use of them. It was however, found that few teachers had direct access to the newer types of resources such as closed circuit television and computer based instruction. A voluminous investigation conducted by Godfrey (1967) examined the state of audio-visual technology for the years 1961 to 1966. One aspect of this investigation dealt with teacher use of instructional resources. It was reported that the type of school in which a teacher taught and more specifically the subject taught were critical variables associated with the use of instructional resources. Elementary teachers used a greater variety of materials and used them to a greater extent than secondary teachers even though a greater variety of equipment was available at the high school level. It was further reported that acceptance of the newer media in schools was primarily based upon faculty interest in the particular resource and that use of the newer media was specific subject oriented.

The relationships between teacher competency and classroom use of educational media were investigated by Streeter (1969). Forty-seven media competencies were selected from Meierhenry's Media Competencies for Teachers. A positive correlation was found between teachers' total media competency scores and total media frequency of use scores. Correlations between each of the forty-seven competencies and total frequency of use scores ranged from $-.02$ to $.33$. One part of an extensive study conducted by Torkelson (1965) examined the factors related to teacher use of audio-visual materials. Results of the investigation suggested that there may be a relationship between what is available in the classroom on a permanent basis and the extent of use by the individual teacher. A demonstration project conducted by Eboch (1966)

examined the effects of film and film strip availability on film and film strip use. When a large collection of film and film strip materials was made available for teachers, the documented use in free choice reached an all time high (average of 103 media uses per teacher). It was concluded that teachers will use audio-visual instructional materials when they are made accessible in the same manner that they were in the project.

Several investigations were primarily concerned with teacher attitude toward instructional resources. Kelly (1960) studied several variables potentially related to teacher attitude toward audio-visual materials. A significant relationship was found between teachers' general attitudes toward audio-visual materials and the frequency with which they used them as well as the amount of equipment available for use. Attitude was not found to be related to years of teaching experience, subject matter area, or funds allocated for audio-visual education. An investigation by Tobias (1968) offered evidence that the threat of automation is of some importance in the attitudes of teachers toward educational media. It was reported that many teachers think they are threatened both by newer media and by "machines" which might replace them.

The research reported indicates that some positive relationships may exist between instructional resource use and availability and between attitude toward resources and their use. Unfortunately, the aforementioned studies identify almost exclusively with classroom media. Resources which are usually associated with shop or laboratory instruction were not considered by the investigators. In view of the fact that shop and laboratory instruction may require rather unique

resources, generalizations of the aforementioned conclusions to a vocational-technical education context are highly tenable.

Objectives

The objectives of this study were to investigate the attitudes of vocational-technical teachers toward classroom and non-classroom instructional resources and to examine interrelationships among teacher attitude toward resources, resource utilization, and resource availability.

More specifically the questions for which answers were elicited included:

1. Toward what instructional resources do teachers have the most favorable attitude?
2. What instructional resources do teachers utilize the most?
3. What instructional resources are most available for teacher use?
4. What interrelationships exist among teacher attitude toward, teacher utilization of, and availability of instructional resources?
5. Can constructs be identified which underly the interrelationships among teacher-instructional resource variables?

II

PROCEDURE

Within this section information is presented relative to the sample selected, measuring instruments used, the data collection process, and data analysis.

Sample

The sample which was utilized in this study consisted of one hundred high school teachers representing eight Central Pennsylvania area vocational-technical schools. Members of the group were currently teaching in a total of twenty-five instructional areas. Over twenty-five percent of the teachers were from the combined areas of machine shop (n=15) and auto mechanics (n=13). A breakdown indicating the number of teachers in each instructional area is provided in Table 1. The group had attained a mean age of 42.8 years and averaged 8.5 years of teaching experience. Additional biographical information is presented in Table 2.

Instruments

Instruments used in the study included a teacher information form, an instructional resource check list, a resource attitude inventory, a resource frequency of use inventory and a resource availability inventory. A brief description of each is presented below. Copies or examples of the various instruments are provided in Appendix A.

TABLE 1
TEACHER GROUP COMPOSITION
BY INSTRUCTIONAL AREA
(n=100)

Instructional Area	Number
Machine Shop	15
Auto Mechanics	13
Drafting/Design	9
Electricity	9
Carpentry	8
Electronics	7
Auto Body	5
Sheet Metal	4
Printing	4
Building Maintenance	3
Cosmetology	3
Welding	3
Data Processing/Computer Programing	2
Cabinet Millwork	2
Plumbing/Heating	2
Masonry	2
Appliance Repair	1
Bricklaying	1
Engineering Technology	1
General Maintenance	1
Health Assistant	1
Industrial Sewing	1
Machine Tool Repair	1
Radio/Television Repair	1
Refrigeration	1

TABLE 2
TEACHER CHARACTERISTICS

	Mean	Standard Deviation	Range
Age in Years	42.77	9.47	23-63
Occupational Experience in Years	15.04	8.40	3-45
Teaching Experience in Years	8.48	8.17	1-36
College Credits Accumulated	58.43	47.69	2-214

Teacher Information Form

In order to gather biographical data about the group, a teacher information form was utilized. The data obtained was used to provide a background profile of the teacher group involved in the research study.

Instructional Resource Check List

The instructional resource check list included twenty-five resources which were thought to have some relevance to the instructional process. Each teacher was asked to indicate whether or not he had ever used any of the resources, either as a teacher or as a student in a class. The check list served to indicate how many teachers had actually been exposed to the listed resources.

Resource Attitude Inventory

In order to obtain attitudinal data, the semantic differential (SD) was utilized. Concepts to be rated by means of the SD consisted of

terms relevant to the area of instructional resources. A total of thirty concepts were chosen for inclusion in the SD with a range from specific resources to general instructional media terms. A listing of the thirty concepts may be found in Appendix B. Adjective pairs to be used in the SD were selected from those identified by Osgood, et. al. (1957) as constituting the evaluative factor. A total of five evaluative scales were identified as having relevance to the concepts which were selected. These included: good-bad, meaningful-meaningless, wise-foolish, valuable-worthless, and fair-unfair. The scales were randomly ordered and placed on a separate sheet for each of the thirty concepts. Prior to instrument administration the thirty concepts were also randomly ordered. The total resource attitude inventory, then, consisted of thirty pages with each page containing a particular concept followed by five evaluative scales.

Resource Frequency of Use Inventory

The frequency of use inventory required each teacher to reflect the degree to which he had used selected resources. Below each of the twenty-five resources was a seven point semantic differential scale with the bi-polar adjectives "always used" and "never used." Each teacher was asked to place an X at that point on the scale which agreed with his or her best judgment about resource frequency of use during the current school year.

Resource Availability Inventory

An availability inventory was used to gather information about the degree to which resources had been available for teacher use. Below

each of twenty-five resources was a seven point semantic differential scale with "always available" at one pole and "never available" at the other pole. Teachers were asked to place an X at that point on the scale which agreed with their best judgment about resource availability during the current school year.

Data Collection and Analysis

Initially, all instruments were administered to a group of teachers. In this manner, an assessment could be made of instrument usability and content as perceived by the teacher. Fourteen vocational-technical teachers in attendance at an inservice summer workshop were selected for this purpose. The group averaged less than thirty minutes to complete all instruments and had no difficulty following stated directions. An examination of group responses indicated that revisions to several items on the teacher information form were necessary. All other instruments appeared to be properly interpreted by the teacher group.

After necessary revisions were completed, contact was made with those persons responsible for the administration of Central Pennsylvania area vocational-technical schools. In all cases, administrators agreed to assist with the study by making their teachers available during the Spring of 1969 so that data could be gathered. For seven of the eight schools used in the study, instruments were administered to teachers as a group at each individual school. In the case of the eighth school, teachers were instructing at a number of different locations and, therefore, the instrument had to be distributed from the central administration office and returned by mail. For seven out of the eight

schools, usable returns ranged from 80 to 100 percent of those instruments which were administered. The eighth school, where forms were completed and returned by mail, provided a usable return of 61 percent. A specific breakdown of returns is included in Table 3.

TABLE 3
BREAKDOWN OF RETURNS BY SCHOOL

School	Teacher n	Usable Returns	
		n	%
A	12	10	83
B	13	12	92
C	25	23	92
D	12	12	100
E	15	12	80
F	5	5	100
G	13	12	92
H	23	14	61 ^a

^aDue to multiple school locations, school H teachers completed the forms individually and returned them by mail.

Instruments were scored and the results placed on data cards. Statistical analyses were performed using the IBM 360/67 computer. Relations among teacher attitude, resource utilization, and resource availability were analyzed by means of the Pearson product moment correlation. Additionally, partial correlations were computed in order that selected variables could be held constant and relationships

assessed more meaningfully (Popham, 1967). The factor analytic method was used to examine teacher attitude, resource use and resource availability variables (Oppenheim, 1966).

III

FINDINGS

This section describes findings of the investigation which were based upon analyses of relevant data. Within the general frame of the study, five specific questions were asked. Findings relevant to these questions are presented below.

Teacher Attitude Toward Instructional Resources

In order to determine which instructional resources teachers had the most favorable attitude toward, twenty-five of the thirty semantic differential (SD) concepts were examined. These concepts represented resources with which the teacher might conceivably have some contact. Initially, a score for each teacher on each concept was established by summing scores on the five evaluative scales (possible score range was from five to thirty-five for each resource). Group means and standard deviations for each resource were then computed. Resource attitude means, in rank order form, are presented on Table 4. Results indicated that the teacher group generally had the most favorable attitude toward more "traditional" instructional resources (i.e. shop or laboratory project, shop or laboratory equipment) and displayed a less favorable attitude toward more "progressive" instructional resources (i.e. computer assisted instruction, teaching machine). Several hardware resources (16 mm and overhead projector) received high composite attitude scores relative to the entire listing while other hardware resources (opaque and 8 mm projector) received relatively low composite scores.

TABLE 4
INSTRUCTIONAL RESOURCE ATTITUDE MEANS
AND STANDARD DEVIATIONS

Resource	Mean	Standard Deviation
Shop or Laboratory Project	33.13	3.234
16mm Motion Picture Projector	33.02	3.369
Shop or Laboratory Equipment	32.72	4.597
Course of Study	32.60	4.053
Overhead Projector	32.59	4.671
Chalkboard	32.03	3.775
Textbook	31.79	3.769
Instruction Sheet	31.43	5.151
Trade and Job Analysis	31.41	4.979
Technical Periodical	30.66	5.390
Three Dimensional Aid	30.66	5.551
Professional Periodical	30.47	4.549
Technical Publication	30.46	4.865
Filmstrip	30.24	5.698
Programed Text	29.98	6.715
Workbook	29.97	5.376
Field Trip	29.76	6.473
Bulletin Board	29.75	5.215
35mm Slide Projector	29.65	6.219
Chart	29.53	5.827
Opaque Projector	29.53	6.031
Educational Television	25.86	7.565
8mm Motion Picture Projector	25.64	7.577
Teaching Machine	23.65	7.720
Computer Assisted Instruction	23.30	6.897

Teacher Use of Instructional Resources

The extent to which teachers used instructional resources was determined by obtaining information from the frequency of use inventory. Teachers were asked to indicate to what degree they had used listed resources during the past school year, a time period which consisted of approximately eight months. Teachers reactions to each resource, which ranged from "always used" to "never used," were converted from the SD scale to a score (possible score range was from one to seven). Group use means and standard deviations were then computed for each resource. The resultant data, in mean rank order form, is given in Table 5. Results indicated that the composite teacher group utilized traditional resources (shop or laboratory equipment, project, textbook, chalkboard) to a greater extent than some of the more progressive resources such as computer assisted instruction, educational television, and teaching machine. A number of the resources which reflected greater use were those more common to the shop or laboratory than the classroom.

Teachers were also asked to indicate whether or not they had ever used the resources "as a teacher or as a student in class." The results in percentage form are presented on Table 6. Twelve of the listed resources had been used by at least ninety percent of the teacher group. Resources used by the lowest percentage of teachers were primarily those of a progressive nature (i.e. computer assisted instruction, teaching machine).

Availability of Instructional Resources

Information dealing with resource availability was also gathered by means of semantic differential scales. Teachers indicated individual

TABLE 5
INSTRUCTIONAL RESOURCE USE MEANS
AND STANDARD DEVIATIONS

Resource	Mean	Standard Deviation
Shop or Laboratory Equipment	6.70	0.904
Shop or Laboratory Project	6.27	1.340
Textbook	6.16	1.412
Chalkboard	5.89	1.450
Course of Study	5.87	1.475
Bulletin Board	5.67	1.712
Instruction Sheet	5.51	1.330
Technical Publication	5.20	1.470
Trade and Job Analysis	5.20	1.752
Chart	5.08	1.716
16mm Motion Picture Projector	5.04	1.969
Technical Periodical	4.88	1.653
Overhead Projector	4.76	2.175
Professional Periodical	4.67	1.848
Workbook	4.62	2.068
Filmstrip	4.13	2.078
Field Trip	3.80	1.995
Three Dimensional Aid	3.64	2.359
35mm Slide Projector	3.05	2.236
Programed Text	2.89	2.098
Opaque Projector	2.76	2.070
8mm Motion Picture Projector	1.70	1.411
Teaching Machine	1.48	1.352
Educational Television	1.25	0.914
Computer Assisted Instruction	1.23	0.789

TABLE 6
TEACHER USAGE OF INSTRUCTIONAL RESOURCES^a

Instructional Resources	Percent
Chalkboard	100
Textbook	100
Bulletin Board	99
Course of Study	99
Shop or Laboratory Project	98
Instruction Sheet	97
Shop or Laboratory Equipment	97
Chart	96
Trade and Job Analysis	94
16mm Motion Picture Projector	93
Technical Publication	91
Workbook	90
Technical Periodical	88
Filmstrip	86
Fieldtrip	85
Overhead Projector	84
Professional Periodical	84
Three Dimensional Aid	64
35mm Slide Projector	57
Opaque Projector	55
Educational Television	48
Programed Text	41
8mm Motion Picture Projector	33
Teaching Machine	18
Computer Assisted Instruction	10

^aTeachers were asked to indicate whether or not they had ever used each resource as a teacher or as a student in class.

resource availability by responding to scales ranging from "always available" to "never available." After teacher responses were converted to individual scores, group means and standard deviations were computed. Table 7 presents resource availability in mean rank order form. Results indicated that traditional classroom type resources (bulletin board, chalkboard, textbook) were most readily available. These were followed by resources associated with the shop or laboratory (equipment, project). Resources of a more progressive nature (educational television, computer assisted instruction, teaching machine) were indicated as being least available to the teacher group.

Relationships Between Teacher Attitude and Resource Use

Teacher attitude and resource use relationships were examined using the Pearson product moment correlation. It was hypothesized that relationships between attitude and use would be positive. The resultant twenty-five correlations are given in Table 8. Twenty-four of the correlations computed were positive while twenty-one were positive and significant ($P < .05$). In effect, teacher attitude toward a resource was positively and significantly related to use of that resource for twenty-one of the twenty-five resources.

In order to examine the effect which resource availability might have on the relationship between attitude and use, the partial correlation technique was used to "partial out" availability, holding it constant. Partial correlations for each of the twenty-five resources are also provided in Table 8. With the influence of availability controlled, most correlations were slightly lower than before. Nineteen of the twenty-five resources, however, still maintained a positive

TABLE 7
INSTRUCTIONAL RESOURCE AVAILABILITY
MEANS AND STANDARD DEVIATIONS

Resource	Mean	Standard Deviation
Bulletin Board	6.76	0.911
Chalkboard	6.74	0.917
Textbook	6.70	1.020
Shop or Laboratory Equipment	6.62	1.013
Shop or Laboratory Project	6.44	1.217
Course of Study	6.33	1.280
Trade and Job Analysis	6.08	1.468
Overhead Projector	6.04	1.723
Instruction Sheet	6.01	1.573
16mm Motion Picture Projector	5.98	1.769
Chart	5.90	1.817
Technical Publication	5.46	1.755
Workbook	5.42	2.080
Professional Periodical	5.35	1.766
Technical Periodical	5.00	1.938
Filmstrip	4.95	2.129
Field Trip	4.49	2.209
Three Dimensional Aid	4.36	2.431
35mm Slide Projector	4.21	2.687
Opaque Projector	3.66	2.583
Programed Text	3.08	2.373
8mm Motion Picture Projector	2.46	2.263
Teaching Machine	1.84	1.762
Computer Assisted Instruction	1.39	1.262
Educational Television	1.36	1.235

TABLE 8
RELATIONSHIPS BETWEEN TEACHER ATTITUDE
AND RESOURCE USE

Resource	r_{12}	$r_{12.3}$
	Teacher Attitude and Resource Use	Teacher Attitude and Resource Use with Resource Availability Partialled Out
Bulletin Board	.202*	.185*
Textbook	.177*	.187*
Trade and Job Analysis	.436**	.369**
Workbook	.244**	.288**
Shop or Laboratory Project	.332**	.058
Computer Assisted Instruction	.171*	.269**
Shop or Laboratory Equipment	-.042	-.094
Technical Periodical	.351**	.241**
Chart	.338**	.286**
Three Dimensional Aid	.375**	.316**
Industrial Publication	.353**	.298**
Field Trip	.306**	.210**
Opaque Projector	.152	.137
Teaching Machine	.134	.012
16mm Projector	.364**	.240**
Overhead Projector	.329**	.247**
Programed Text	.180*	.084
Educational Television	.027	.194*
Chalkboard	.583**	.541**
Filmstrip	.257**	.152
Professional Periodical	.439**	.236**
8mm Projector	.226*	.205*
Instruction Sheet	.329**	.311**
35mm Projector	.365**	.228*
Course of Study	.344**	.319**

*P<.05 for 1 tailed test

**P<.01 for 1 tailed test

and significant correlation between attitude and use. Resource availability, therefore, had a moderate reducing effect on some attitude-use correlations. Results indicated that, if availability is held constant, the relationship between teacher attitude and resource use is generally slightly but not appreciably reduced.

Relationships Between Resource Availability and Use

Correlational techniques were employed to examine resource availability-use relationships. It was hypothesized that relationships would be positive. Correlations presented in Table 9 reflect results of the analyses. Use and availability correlated positively and significantly ($P < .01$) for all twenty-five variables. The results, therefore, reflected that resource availability was positively and significantly related to resource use.

The effect of teacher attitude on the relationship between resource use and resource availability was examined by holding attitude constant. Partial correlations for the twenty-five variables are provided in Table 9. With the influence of attitude controlled, most of the resource use-availability correlations were slightly lower. It should be noted, however, that all use-availability relationships remained positive and significant ($P < .01$). Results indicated that, if teacher attitude is held constant, the positive and significant relationships between resource availability and resource use are not appreciably affected.

TABLE 9
RELATIONSHIPS BETWEEN RESOURCE USE
AND RESOURCE AVAILABILITY

Resource	r_{23} Resource Use and Resource Availability ^a	$r_{23.1}$ Resource Use and Resource Availability with Teacher Attitude Partialled Out ^a
Bulletin Board	.344	.335
Textbook	.349	.354
Trade and Job Analysis	.363	.272
Workbook	.678	.688
Shop or Laboratory Project	.614	.550
Computer Assisted Instruction	.740	.754
Shop or Laboratory Equipment	.315	.325
Technical Periodical	.555	.506
Chart	.495	.466
Three Dimensional Aid	.660	.640
Industrial Publication	.406	.362
Field Trip	.614	.586
Opaque Projector	.241	.233
Teaching Machine	.469	.454
16mm Projector	.542	.483
Overhead Projector	.491	.448
Programed Text	.718	.709
Educational Television	.376	.342
Chalkboard	.348	.243
Filmstrip	.419	.371
Professional Periodical	.571	.460
8mm Projector	.395	.384
Instruction Sheet	.278	.256
35mm Projector	.669	.630
Course of Study	.526	.513

^aAll correlations significant at the .01 level for a 1 tailed test.

Constructs Underlying Teacher-Instructional Resource Variables

In order to determine whether meaningful constructs or dimensions were basic to the variables included in this investigation, the factor analytic approach was used. Basically, this approach analyzes a group of intercorrelations in such a manner that a few dimensions may be identified which describe the variables being examined.

Analysis of Teacher Attitude, Resource Use, and Resource Availability Variables

Initially, seventy-five resource variables were analyzed. These consisted of twenty-five teacher attitude variables, twenty-five resource use variables, and twenty-five resource availability variables. All variables were intercorrelated and the resultant 75 x 75 matrix was factor analyzed using the principal components method (Harmon, 1960). Three factors were extracted. The results were then orthogonally rotated using the varimax criterion (Kaiser, 1958). The rotated factor loadings appear in Table 10.

Factor 1. This factor accounted for 9.47 percent of the total variance. An examination of factor loadings revealed that attitude variables loaded most highly on this factor. Thirteen of the 25 attitude variables had loadings of over .50 on this factor while none of the use or availability variables loaded significantly. The evidence suggested the presence of a generalized attitude factor reflecting attitude toward instructional resources.

Factor 2. 4.99 percent of the total variance was accounted for by the second factor. This factor was identified as "software," particularly as related to publications and periodicals.

TABLE 10
 ROTATED FACTOR LOADINGS FOR
 ATTITUDE, AVAILABILITY, AND USE VARIABLES^a

Variable	Factor 1	Factor 2	Factor 3
Bulletin Board Attitude	0.551	0.195	0.128
Technical Periodical Attitude	0.636	0.328	0.033
Chart Attitude	0.646	0.308	0.027
Three Dimensional Aid Attitude	0.501	-0.223	-0.046
Industrial Publication Attitude	0.557	0.266	-0.022
Field Trip Attitude	0.534	0.045	-0.103
Opaque Projector Attitude	0.534	-0.155	0.093
Overhead Projector Attitude	0.505	-0.169	-0.041
Educational Television Attitude	0.615	-0.094	0.006
Filmstrip Attitude	0.560	0.065	-0.304
Instruction Sheet Attitude	0.650	0.006	-0.045
35mm Projector Attitude	0.511	0.135	-0.346
Course of Study Attitude	0.611	0.089	-0.029
Technical Publication Use	0.111	0.629	-0.145
Chart Use	0.113	0.568	-0.210
Professional Periodical Use	0.085	0.702	-0.038
Technical Periodical Use	0.123	0.747	-0.099
Technical Publication Availability	0.159	0.614	-0.064
Professional Periodical Availability	0.086	0.681	-0.045
Technical Periodical Availability	0.110	0.720	0.023
Computer Assisted Instruction Use	0.002	0.173	0.674
35mm Projector Use	0.141	0.264	-0.595
Filmstrip Use	0.034	-0.011	-0.540
16mm Projector Use	0.189	0.180	-0.512
Computer Assisted Instruction Availability	-0.094	0.132	0.621
35mm Projector Availability	0.207	0.249	-0.500
Bulletin Board Availability	0.162	0.020	-0.547

^aOnly those factor loadings of .50 or above on at least one factor have been included.

The highest loadings on Factor 2 consisted of both resource use and resource availability variables. In most cases these variables were operationally related to each other (i.e. technical publication use and availability, professional periodical use and availability, technical periodical use and availability). Factor 2, therefore, appears to represent a combination of use and availability variables related generally to software and specifically to publications and periodicals. In effect, if resources in this category are available they seem quite likely to be utilized by the teacher.

Factor 3. This factor accounted for 3.68 percent of the total variance. Factor 3 was identified as "hardware," specifically related to projector type resources. Variables which had their highest loadings on this factor also included resource use and resource availability variables. Computer assisted instruction use and availability loaded positively on this factor while other more traditional resources loaded negatively. The only traditional resource variables which might be considered as being operationally related to each other were 35mm projector use and 35mm projector availability. Generally, the variables related to hardware as a common denominator. An exception to this was bulletin board availability which had a -0.547 loading on the factor. Variable loadings suggest that teachers may tend to use some hardware resources when they are available and that use of a projector type resource may reflect use of other similar resources (i.e. 35mm projector, filmstrip, 16mm projector).

Analysis of Teacher Attitude Variables

As a result of the initial analysis, a factor emerged which was identified as generalized attitude toward instructional resources. The variance accounted for by this factor suggested that dimensions might underly generalized attitude. Therefore, in order to examine this factor more closely, a second analysis was conducted. This analysis examined possible constructs underlying teacher attitude toward instructional resources. The thirty concepts which were examined are presented in Appendix B. Teacher attitude scores for the concepts or variables were intercorrelated. The 30 x 30 correlation matrix was then subjected to a principal components factor analysis. The Kiel-Wrigley criterion was used to determine the largest number of common factors (Kerlinger, 1966). This criterion defines "common factor" as a rotated factor on which at least three variables have their highest loadings. Therefore, two through eight factors were rotated independently of each other. Since the eighth factor did not meet the Kiel-Wrigley criterion, a total of seven factors are reported.

Variable loadings on each factor are given in Table 11. Although total factor variance was rather low, variables seemed to cluster in a manner which allowed interpretation.

Factor 1. This factor accounted for 8.21 percent of the total variance. A study of the four variables loading highest on the first factor revealed that they were resources principally used in the classroom (35mm projector, filmstrip, 16mm projector, 8mm projector). It was further interpreted that they were resources of the type not prepared by the teacher. Teacher control over resources of this type when instructional material is being presented seems limited.

TABLE 11

ROTATED FACTOR LOADINGS FOR INSTRUCTIONAL RESOURCE ATTITUDE VARIABLES

	F 1	F 2	F 3	F 4	F 5	F 6	F 7
BULBDATT	-0.03684	0.14400	0.20323	-0.24187	0.11007	0.33776	-0.63914
TXTATT	0.03518	-0.00196	0.07887	-0.23155	-0.02906	0.85280	-0.00998
TRADRAT	0.22924	-0.07196	0.27881	-0.23820	0.22873	0.62886	-0.15514
TJALAT	0.21322	0.33003	0.62260	0.14886	-0.08789	0.28366	-0.16166
WKBKATT	0.06386	0.34746	0.16977	0.17021	0.32384	0.38120	-0.23233
SHPRJATT	0.25365	0.02150	0.45031	0.00657	0.14751	-0.04465	0.02763
CAIATT	0.02522	0.02527	0.19608	-0.05891	0.65608	0.12821	-0.03896
SHPEPTAT	-0.08704	0.13353	0.58920	-0.22125	0.01041	0.18437	0.03998
NWRIRAT	-0.07321	0.14449	0.62669	-0.40049	-0.09222	0.34298	-0.13537
TCHPRDAT	0.11386	0.05239	0.16016	-0.63658	0.08722	0.21041	-0.36034
CHTAT	0.21932	-0.04137	0.23404	-0.55696	0.16460	0.36175	-0.26136
3DAIDATT	0.10432	0.73878	0.28251	-0.15153	0.10896	-0.09901	0.09705
IPUBAT	0.24755	0.12526	-0.01479	-0.62218	-0.02268	0.19038	-0.26763
FLDTRPAT	0.14305	-0.06353	0.27150	-0.47272	0.05648	-0.24613	-0.50177
OPAQUEAT	-0.05451	0.74786	-0.02884	-0.24802	0.14895	-0.08249	-0.19375
TCHMCHAT	0.05218	0.24187	-0.09735	-0.03255	0.71189	0.05739	0.04957
16MMATT	0.60407	0.11871	-0.15540	-0.24806	0.01197	-0.08041	-0.38749
QVRHDATT	0.26640	0.80897	0.02367	0.05698	0.10502	0.16493	0.00265
AVEDATT	0.48851	0.20331	0.29463	-0.48622	0.03203	0.20691	-0.06241
ATOINSAT	0.13600	0.27086	0.26159	-0.13002	0.66106	-0.30290	-0.11466
PGMTXTAT	0.11379	-0.08375	-0.09650	-0.46709	0.57663	0.14989	-0.12394
ETVATT	0.02544	0.34121	0.44708	-0.38219	0.32073	-0.10831	0.02853
CHKBDATT	0.13549	0.06508	0.00028	-0.12843	0.01169	0.04316	-0.81425
FLMSTRAT	0.74890	-0.02431	0.12913	-0.09228	0.10167	0.12799	-0.33378
PROPRDAT	0.17393	0.11079	0.07770	-0.64148	0.04681	0.07811	-0.09410
8MMAT	0.59291	0.20934	0.20630	-0.01987	0.13367	-0.04583	0.21721
INSHTATT	0.05068	0.48404	0.40506	-0.30906	0.10049	0.07405	-0.22442
EDTECHAT	0.02745	0.15628	0.24401	-0.69135	0.19193	-0.02838	0.08566
35MMATT	0.75130	0.06440	0.06272	-0.34308	0.02034	0.15906	-0.01310
CRSTDYAT	0.20717	-0.09155	0.66071	-0.28498	0.20435	0.02022	-0.28570

Factor 2. 2.60 percent of the total variance was accounted for by Factor 2. The three variables loading highest on this factor consisted of resources more commonly associated with classroom use (overhead projector, opaque projector, 3-dimensional aid). In this case, resources might be categorized as being utilized primarily with teacher prepared or selected instructional material. Additionally, use of these resources could be termed under teacher control.

Factor 3. The third factor accounted for 1.97 percent of the total variance. Three of the four variables which loaded highest on this factor were resources primarily related to shop or laboratory instruction (course of study, trade and job analysis, shop or laboratory equipment). A fourth variable (newer instructional resources) had moderate loading on two other factors in addition to a rather high loading on Factor 3. Resources might be identified as being teacher prepared or selected and of the type over which the teacher has control in the instructional environment.

Factor 4. 1.71 percent of the total variance was accounted for by this factor. Resources (variables) which loaded highest on Factor 4 might be classified in the publication-periodical area (professional periodical, technical periodical, industrial publication). Resources appeared to be primarily non-teacher prepared and non-teacher controlled as far as instructional content is concerned. Interestingly, the variable "educational technology" loaded very highly on this factor. One explanation for the loading might be that the teacher group interpreted educational technology as to mean "industrial technology" or "technical education."

Factor 5. This factor accounted for 1.48 percent of the total variance. Variables loading highest on the factor were primarily associated with "newer media" (teaching machine, automated instruction, computer assisted instruction, programed text). No differentiation on the basis of use could be established (classroom vs. shop/laboratory). Variables did, however, appear to reflect non-teacher preparation and non-teacher control.

Factor 6. 1.42 percent of the total variance was accounted for by this factor. The two resources which had their highest loading on Factor 6 were primarily classroom use oriented (text, workbook). It should be noted that the variable "workbook" had only moderate loading on this particular factor. Resources might be interpreted as being non-teacher prepared and under teacher control as far as instructional use is concerned. The variable "traditional instructional resources" maintained a strong loading on this factor. It may well be that the teacher group saw resources included in this factor as being most traditional.

Factor 7. This factor accounted for 1.24 percent of the total variance. The three resources loading highest on Factor 7 appeared to be associated with both classroom and shop/laboratory use (chalkboard, bulletin board, field trip). Additionally the resources reflected teacher selection or preparation and teacher control over material presented within an instructional context.

Based upon the preceeding factor interpretations a generalized classification of instructional resources may be established. This classification is given in Figure 1. It should be noted that the schema presented is, at best highly tentative. Additionally, it must be

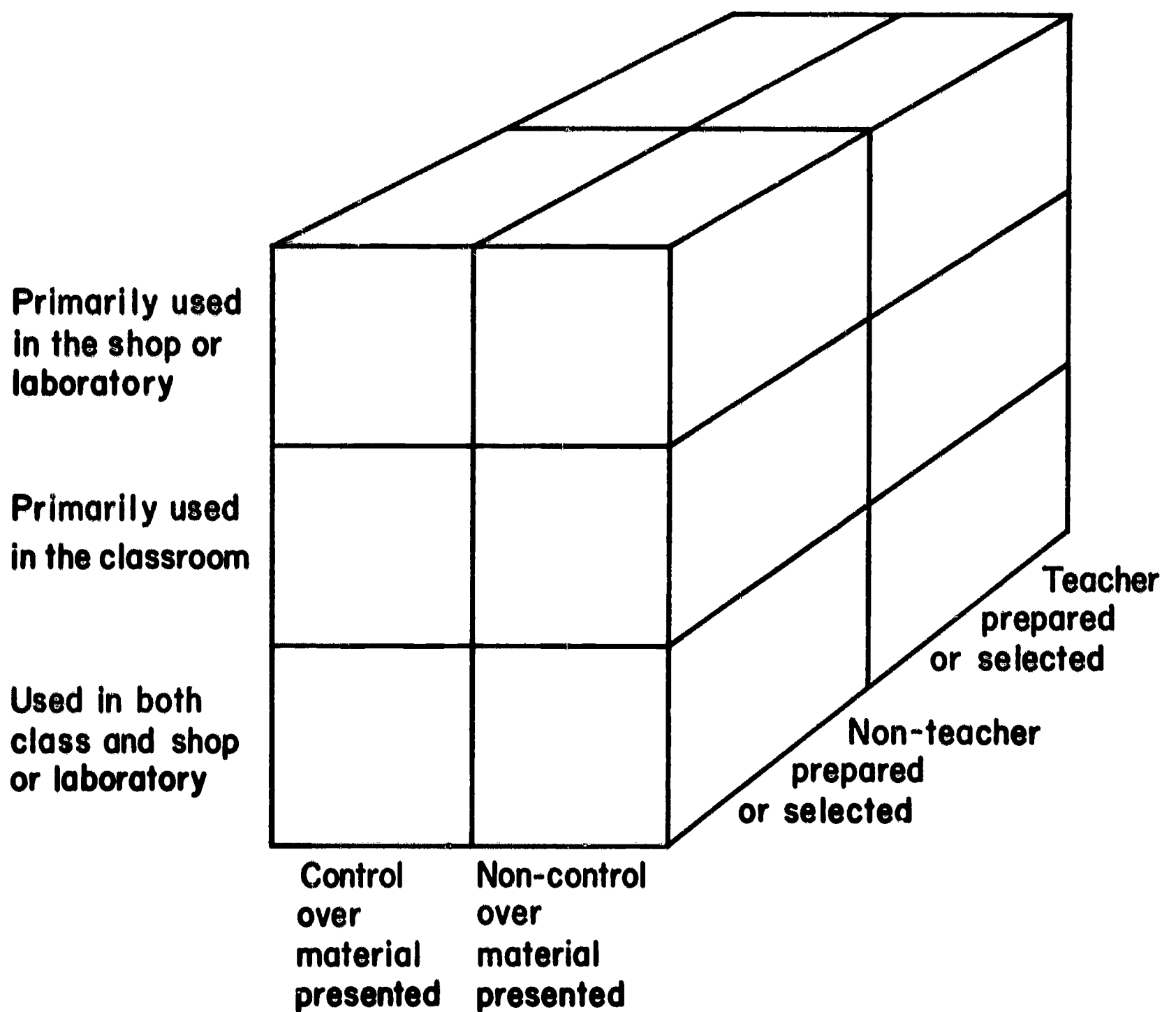
FIGURE 1

INSTRUCTIONAL CLASSIFICATION SCHEMA

FOR

INSTRUCTIONAL RESOURCES

BASED ON TEACHER ATTITUDE



remembered that teacher attitude measures were used as a basis for classification development.

According to the arrangement, teachers perceive instructional resources relative to three dimensions: selection/preparation, presentation, and environment. Although specific classification of certain resources may be somewhat difficult, resource classification in accordance with the three aforementioned dimensions is not unrealistic. In effect, the schema reflects tentative classification which is related to empirically defined categories. Additional research will be necessary before firm conclusions relative to the classification schema may be established.

IV

CONCLUSIONS AND IMPLICATIONS

Conclusions

Based upon the findings presented in the previous section, there are a number of conclusions which may be reached relative to the vocational-technical teacher and instructional resources. In order that these conclusions may be presented in a meaningful manner, each question which was stated in the introductory portion of the study will be restated, with the appropriate discussion following it.

Toward What Instructional Resources do Teachers Have the Most Favorable Attitude?

Results revealed that the composite teacher group generally had most favorable attitudes toward those instructional resources which were of a more "traditional" nature. Composite attitude scores indicated that the more "progressive" instructional resources were favored less by the teacher group. The relative attitudes of teachers toward resources parallel findings of Tobias (1968) which indicated that threat of automation may be of some importance in the attitudes which teachers have toward instructional resources. Results suggest that vocational-technical teachers may view those resources which have "been around" for a long period of time more favorably than those resources which the teacher does not consider to be "traditional." Interestingly enough, the teacher group displayed high attitudes toward "16mm motion picture projector" and "overhead projector." In view of the fact that a number of resources which teachers regarded more favorably were traditional in nature, it might well be that teachers favor these two more recent

additions to the school resource inventory as much as traditional resources.

What Instructional Resources do Teachers Utilize the Most?

Data revealed that the teacher group tended to utilize traditional resources to a greater extent than progressive resources. Instructional resources which reflected the greatest amount of use were those which could be considered to receive greater use by the vocational-technical teacher (shop or laboratory equipment, shop or laboratory project, textbook, chalkboard). Those resources which reflected the least use might be classified as newer media (computer assisted instruction, educational television, teaching machine, 8mm motion picture projector). It appears, therefore, that the relative use of instructional resources by vocational-technical teachers may parallel those instructional activities with which students become most involved (shop or laboratory experiences). When asked to indicate whether or not they had ever used the resources "as a teacher or as a student in a class," a higher percentage of a teacher group indicated use of the more traditional resources while a lower percentage indicated use of the more progressive resources. Results indicate that a number of vocational-technical teachers have never been exposed to some of the newer media such as computer assisted instruction, teaching machines, 8mm motion picture projectors, and programmed textbooks.

What Instructional Resources are Most Available for Teacher Use?

Teachers indicated that those resources which were most readily available consisted of the more traditional type. These included

bulletin board, chalkboard, and textbook. The findings tended to agree with results reported by the National Education Association (1967). Resources of a shop or laboratory nature were indicated as being somewhat less available for use than the above mentioned ones. Those resources which were least available for use by the teacher group included educational television, computer assisted instruction, and teaching machine. The results suggest that those resources which more commonly appear in the classroom context are most available for use. Resources more specifically related to the shop or laboratory seemed to be slightly less available to teachers than classroom resources; however the difference appeared negligible. In general, resources of a more traditional nature seemed to be more available to vocational-technical teachers than resources of a progressive nature.

What Relationships Exist Among the Teacher's Attitude Toward, Teacher Utilization of, and Availability of Instructional Resources?

Initially the relationships between teacher attitude and resource use were examined. Results indicated that relationships between attitude and use were generally positive and significant. The findings parallel those reported by Kelly (1960). Resource availability had only a moderate reducing effect on this relationship. The results suggest that if a teacher has a positive attitude toward instructional resources he will be more likely to use these resources. Although attitude-use relationships existed for a number of resources listed, the results reflected that, for certain specific resources, no significant relationship existed. It seems, therefore, that each particular resource which the teacher may have at his disposal must be examined

individually relative to the teacher attitude. Then some determination may be made with regard to its eventual use.

Resource availability and use related in a positive and significant manner for all twenty-five of the resources which were examined. These results confirmed the previous findings of Torkelson (1965) and Eboch (1966). It was additionally found that teacher attitude did not appreciably affect resource use-availability relationships for any of the resources. Results suggest that the degree to which a resource is available for teacher use may provide some indication of the extent to which it will be used by the teacher. Interestingly enough, some of the higher correlations between use and availability were obtained for those resources which might be classified as progressive in nature (i.e. computer assisted instruction, teaching machine, programmed text). It might be that if more progressive instructional resources are made available to teachers they will be used.

Can Constructs be Identified Which Underly the Interrelationships Among Teacher-Instructional Resource Variables?

Analysis of resource variables seemed to indicate that teacher attitude toward a particular resource might reflect his attitude toward many resources. The results suggested that resource use and availability are related. The use-availability relationships, however, may be oriented toward certain classes of resources such as "software" and "hardware." In effect, although a teacher may be more likely to use those software type instructional resources which are made available to him he may not be receptive to using hardware resources which are available for his use. Conversely, another teacher may extensively

utilize those hardware type resources which are made available to him and may not use software type resources which are made available.

Analysis of attitude variables revealed that teachers may view instructional resources in accordance with their personal involvement with resource preparation, selection, presentation, and application. The results seemed to suggest that resources may be classified in accordance with the aforementioned teacher perceptions. Teacher attitude toward a particular resource may be dependent upon his or her feelings relative to the particular teaching environment where it may be used (classroom, shop or laboratory, or both), whether or not the resource is teacher prepared or selected, and whether or not the teacher has control over the instructional material which is presented.

Implications

Based upon the results and conclusions, several implications can be gleaned which have relevance to program improvement in vocational-technical education. These are presented in the paragraphs which follow. It is hoped that the reader will interpret each of the comments in light of results upon which it is based and data gathering procedures which were used in the study.

1. Teachers seem to have more favorable attitudes toward traditional type resources than resources which might be termed progressive. Additionally, they tend to utilize most those resources which are more traditionally associated with shop or laboratory instruction. It appears that teacher preference toward more traditional resources may hinder innovative activities which involve instruction using more progressive resources. Teachers should, therefore, be fully oriented

to each resource as it is being incorporated into the instructional environment.

2. Many teachers have never had contact with some of the newer instructional resources. It would, therefore, seem best to provide preservice and inservice teacher experiences which include direct exposure to newer resources. "Hands on" type experiences with resources should be considered.

3. Resources which are most available for teachers use tend to be those of a more traditional nature which are primarily used in the classroom. In this case, consideration should be given to the increased availability of more progressive resources for teacher use if it is felt they will make significant contributions to program objectives.

4. In general, the more positive a teacher's attitude is toward an instructional resource, the more likely he or she is to use the resource. Teacher education programs should, therefore, strive to inculcate the potential teacher with proper attitudes toward all potential instructional resources. Development of more positive attitudes toward instructional resources may well result in increased resource use.

5. The extent to which an instructional resource will be used depends upon the extent to which it is available for use by the teacher. Administrators who are desirous of having teachers fully utilize instructional resources would do well to make them readily available for use. This applies to progressive as well as traditional resources. It appears that the relationship between availability and use is relatively strong for a number of resources. Program administrators and supervisors should capitalize on this relationship to attain increased instructional resource utilization.

6. Teacher attitude toward a particular instructional resource may indicate his or her attitude toward other resources. Factors such as resource preparation, selection, presentation, and application may affect this attitude. The prospective teacher should, therefore, be provided with extensive information relative to instructional resources. This might include resource preparation and selection as well as resource capabilities and limitations. Relevant knowledge concerning resources may aid each individual teacher to determine where resources might be best utilized within the instructional environment.

REFERENCES

- Biddle, Bruce J. "Methods and Concepts in Classroom Research." Review of Educational Research. Volume 37, No. 3, 1967, pp. 337-357.
- Eboch, Sidney C. Implementation of Research Strategies and Tactics for Demonstrations of Newer Media. Columbus: The Ohio State University, Contract No. OE-5-16-016, September, 1966.
- Gage, N. L., Editor. Handbook of Research on Teaching. Chicago: Rand McNally, 1963.
- Godfrey, Eleanor P. The State of Audiovisual Technology: 1961-1966. Washington: National Education Association Department of Audiovisual Instruction, Monograph No. 3, 1967.
- Harmon, H. H. Modern Factor Analysis. Chicago: University of Chicago Press, 1960.
- Kaiser, H. F. "The Varimax Criterion for Analytic Rotation in Factor Analysis." Psychometrika. 1958, 23, pp. 187-200.
- Kelly, Gaylen B. "A Study of Teacher's Attitudes Toward Audiovisual Materials." Education Screen and AV Guide. Vol. 39, March, 1960, pp. 119-121.
- Kerlinger, Fred N. "Attitudes Toward Education and Perceptions of Teacher Characteristics." American Educational Research Journal. Vol. 3, No. 3, 1966, p. 163.
- National Education Association. "Instructional Resources in the Classroom." NEA Research Bulletin. Vol. 45, No. 3., October, 1967, pp. 75-77.
- Oppenheim, A. N. Questionnaire Design and Attitude Measurement. New York: Basic Books, 1966, pp. 142-143.
- Osgood, C., Suci, G., and Tannebaum, P. The Measurement of Meaning. Urbana, Ill.: University of Illinois Press, 1957.
- Popham, W. James. "Curriculum Materials." Review of Educational Research. Volume 39, No. 3, 1969, p. 319.
- Popham, W. James. Educational Statistics, Use and Interpretation. New York: Harper and Row, 1967, p. 81.
- Samson, Harland E. "Staffing." Review of Educational Research. Volume 38, No. 4, 1968, p. 408.
- Streeter, C. Edward. "Teacher Competency and Classroom Use of Educational Media." Audiovisual Instruction. January, 1969, pp. 60-62.

Taylor, Robert E. and Christensen, Virgil E. "Instructional Media in Vocational Education, A Survey of the Uses and Potential." American Vocational Journal. January, 1967, pp. 17-19.

Tobias, Sigmund. "Dimensions of Teacher's Attitudes Toward Instructional Media." American Educational Research Journal. Vol. 5, No. 1, 1968, pp. 91-98.

Torkelson, G. M. An Experimental Study of Patterns for Improving the Preparation of Pre-Service Teachers in the Use of Audio-visual Materials and of Effects on Pupils. University Park: The Pennsylvania State University, 1965.

Travers, Robert M. W. "A Study of the Relationship of Psychological Research to Educational Practice." Training Research and Education. Edited by Robert Glaser. Pittsburgh: University of Pittsburgh Press, 1962, pp. 525-558.

APPENDIX A
Instruments Used in the Study

THE PENNSYLVANIA STATE UNIVERSITY

247 CHAMBERS BUILDING
UNIVERSITY PARK, PENNSYLVANIA 16802College of Education
Department of Vocational Education

Dear Industrial Educator:

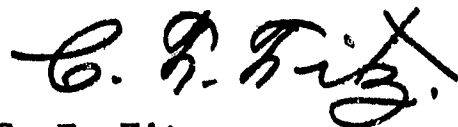
The Department of Vocational Education at Penn State with support from the Pennsylvania Bureau of Vocational, Technical, and Continuing Education is currently conducting a study dealing with instructional resources in vocational and technical education. Your school is among those selected to participate in the study.

The purpose of this study is to provide information which can be applied to future curriculum planning in vocational industrial teacher education. It will also give some indication of how well local school districts are meeting the needs of the teacher. This is not a graduate student study.

Enclosed you will find a series of forms. Would you please complete the forms following the directions which are provided. All information will remain strictly confidential. Your cooperation is greatly appreciated.

☐ Check here if you desire a summary of the final report.

Sincerely,

Curtis R. Finch
Research SpecialistJoseph T. Impellitteri, Chairman
Graduate Studies and ResearchC. F. Fitz
Senior Area Coordinator of Industrial Education
Department of Public Instructionjrd
Enclosures

INSTRUCTIONS

The purpose of this study is to measure the meanings of certain things to various people. You will make judgments about certain things by relating them to a series of descriptive scales. Please make your judgments on the basis of what these things mean to you. On each page of this booklet you will find a different concept to be judged and beneath it a set of scales. You are to rate the concept on each of these scales in order.

Here is how you are to use these scales: If you feel that the concept at the top of the page is very closely related to one end of the scale, you should place your check-mark as follows:

fair X : : : or : : : unfair
fair : : : : X unfair

If you feel that the concept is quite closely related to one or the other end of the scale (but not extremely), you should place your check-mark as follows:

strong_____ : X : _____ : _____ : _____ : _____ : weak
or
strong_____ : _____ : _____ : _____ : _____ : X : weak

If the concept seems only slightly related to one side as opposed to the other side (but is not really neutral), then you should check as follows:

active _____ : _____ : **X** : _____ : _____ : _____ : _____ passive
or
active _____ : _____ : _____ : _____ : **X** : _____ : _____ passive

The direction toward which you check, of course, depends upon which of the two ends of the scale seem most characteristic of the thing you are judging.

If you consider the concept to be neutral on the scale, both sides of the scale equally associated with the concept, or if the scale is completely irrelevant, unrelated to the concept, then you should place your check-mark in the middle space:

safe _____ : _____ : _____ : X : _____ : _____ : _____ dangerous

IMPORTANT: (1) Place your check-marks in the middle of spaces, not on the boundaries: This -- Not This

$$\begin{array}{ccccccc} & & & & & & X \\ & & & & & & \\ \hline & : & : & : & X & : & : & : & : \\ \hline \end{array}$$

- (2) Be sure you check every scale for every concept--do not omit any.
- (3) Never put more than one check-mark on a single scale.

Sometimes you may feel as though you have had the same item before on the test. This will not be the case, so do not look back and forth through the items. Do not try to remember how you checked similar items earlier in the test. Make each item a separate and independent judgment. Work at fairly high speed.

Do not worry or puzzle over individual items. It is your first impressions, the immediate "feelings" about the items, that we want. On the other hand, please do not be careless, because we want your true impressions.

SAMPLE PAGE FROM RESOURCE ATTITUDE INVENTORY

BULLETIN BOARD

bad _____:_____:_____:_____:_____:_____good

meaningful _____:_____:_____:_____:_____:_____meaningless

foolish _____:_____:_____:_____:_____:_____wise

valuable _____:_____:_____:_____:_____:_____worthless

fair _____:_____:_____:_____:_____:_____unfair

INSTRUCTIONAL RESOURCE FREQUENCY OF USE INVENTORY

INSTRUCTIONS: Below is a list of instructional resources. To what degree would you say you have used each of them during the current teaching year? Place an X at the point on the scale that agrees with your best judgment. Be sure to place an X on each scale. Follow the same directions for marking that were given previously.

1. CHALKBOARD

always used _____:_____:_____:_____:_____:_____:_____ never used

2. COMPUTER ASSISTED INSTRUCTION

never used _____:_____:_____:_____:_____:_____:_____ always used

3. INSTRUCTION SHEET

always used _____:_____:_____:_____:_____:_____:_____ never used

4. 8mm MOTION PICTURE PROJECTOR

never used _____:_____:_____:_____:_____:_____:_____ always used

5. EDUCATIONAL TELEVISION

never used _____:_____:_____:_____:_____:_____:_____ always used

6. TECHNICAL PUBLICATION

always used _____:_____:_____:_____:_____:_____:_____ never used

7. WORKBOOK

always used _____:_____:_____:_____:_____:_____:_____ never used

8. 35mm SLIDE PROJECTOR

always used _____:_____:_____:_____:_____:_____:_____ never used

9. FILMSTRIP

never used _____:_____:_____:_____:_____:_____:_____ always used

10. TRADE AND JOB ANALYSIS

never used _____:_____:_____:_____:_____:_____:_____ always used

11. BULLETIN BOARD

never used _____:_____:_____:_____:_____:_____:_____ always used

12. OPAQUE PROJECTOR

always used _____:_____:_____:_____:_____:_____:_____ never used

INSTRUCTIONAL RESOURCE FREQUENCY OF USE INVENTORY (continued)

13. CHART

never used _____:_____:_____:_____:_____:_____:_____ always used

14. PROFESSIONAL PERIODICAL

always used _____:_____:_____:_____:_____:_____:_____ never used

15. PROGRAMED TEXT

always used _____:_____:_____:_____:_____:_____:_____ never used

16. SHOP OR LABORATORY EQUIPMENT

never used _____:_____:_____:_____:_____:_____:_____ always used

17. TEXTBOOK

always used _____:_____:_____:_____:_____:_____:_____ never used

18. FIELD TRIP

always used _____:_____:_____:_____:_____:_____:_____ never used

19. 16mm MOTION PICTURE PROJECTOR

never used _____:_____:_____:_____:_____:_____:_____ always used

20. COURSE OF STUDY

never used _____:_____:_____:_____:_____:_____:_____ always used

21. OVERHEAD PROJECTOR

never used _____:_____:_____:_____:_____:_____:_____ always used

22. TEACHING MACHINE

always used _____:_____:_____:_____:_____:_____:_____ never used

23. THREE DIMENSIONAL AID

always used _____:_____:_____:_____:_____:_____:_____ never used

24. SHOP OR LABORATORY PROJECT

always used _____:_____:_____:_____:_____:_____:_____ never used

25. TECHNICAL PERIODICAL

never used _____:_____:_____:_____:_____:_____:_____ always used

INSTRUCTIONAL RESOURCE AVAILABILITY INVENTORY

INSTRUCTIONS: Below is a list of instructional resources. To what degree would you say that they have been available for your use during the current teaching year? Place an X at that point on the scale that agrees with your best judgment. Be sure to place an X on each scale. Follow the same directions for marking that were given previously.

1. CHALKBOARD

always available _____:_____:_____:_____:_____:_____never available

2. COMPUTER ASSISTED INSTRUCTION

never available _____:_____:_____:_____:_____:_____always available

3. INSTRUCTION SHEET

always available _____:_____:_____:_____:_____:_____never available

4. 8mm MOTION PICTURE PROJECTOR

never available _____:_____:_____:_____:_____:_____always available

5. EDUCATIONAL TELEVISION

never available _____:_____:_____:_____:_____:_____always available

6. TECHNICAL PUBLICATION

always available _____:_____:_____:_____:_____:_____never available

7. WORKBOOK

always available _____:_____:_____:_____:_____:_____never available

8. 35mm SLIDE PROJECTOR

always available _____:_____:_____:_____:_____:_____never available

9. FILMSTRIP

never available _____:_____:_____:_____:_____:_____always available

10. TRADE AND JOB ANALYSIS

never available _____:_____:_____:_____:_____:_____always available

11. BULLETIN BOARD

never available _____:_____:_____:_____:_____:_____always available

12. OPAQUE PROJECTOR

always available _____:_____:_____:_____:_____:_____never available

INSTRUCTIONAL RESOURCE AVAILABILITY INVENTORY (continued)

13. CHART

never available _____:_____:_____:_____:_____:_____:_____always available

14. PROFESSIONAL PERIODICAL

always available _____:_____:_____:_____:_____:_____:_____never available

15. PROGRAMED TEXT

always available _____:_____:_____:_____:_____:_____:_____never available

16. SHOP OR LABORATORY EQUIPMENT

never available _____:_____:_____:_____:_____:_____:_____always available

17. TEXTBOOK

always available _____:_____:_____:_____:_____:_____:_____never available

18. FIELD TRIP

always available _____:_____:_____:_____:_____:_____:_____never available

19. 16mm MOTION PICTURE PROJECTOR

never available _____:_____:_____:_____:_____:_____:_____always available

20. COURSE OF STUDY

never available _____:_____:_____:_____:_____:_____:_____always available

21. OVERHEAD PROJECTOR

never available _____:_____:_____:_____:_____:_____:_____always available

22. TEACHING MACHINE

always available _____:_____:_____:_____:_____:_____:_____never available

23. THREE DIMENSIONAL AID

always available _____:_____:_____:_____:_____:_____:_____never available

24. SHOP OR LABORATORY PROJECT

always available _____:_____:_____:_____:_____:_____:_____never available

25. TECHNICAL PERIODICAL

never available _____:_____:_____:_____:_____:_____:_____always available

INSTRUCTIONAL RESOURCE USE CHECK LIST

INSTRUCTIONS: Below are a list of instructional resources. If you have ever used a particular resource as a teacher or a student in a class, place a check mark in the "YES" column. If you have never used the resource, place a check mark in the "NO" column.

	<u>YES</u>	<u>NO</u>
1. Chalkboard.	[]	[]
2. Computer Assisted Instruction	[]	[]
3. Instruction Sheet	[]	[]
4. 8mm Motion Picture Projector.	[]	[]
5. Educational Television.	[]	[]
6. Technical Publication	[]	[]
7. Workbook.	[]	[]
8. 35mm Slide Projector.	[]	[]
9. Filmstrip	[]	[]
10. Trade and Job Analysis.	[]	[]
11. Bulletin Board.	[]	[]
12. Opaque Projector.	[]	[]
13. Chart	[]	[]
14. Professional Periodical	[]	[]
15. Programed Text.	[]	[]
16. Shop or Laboratory Equipment.	[]	[]
17. Textbook.	[]	[]
18. Field Trip.	[]	[]
19. 16mm Picture Projector.	[]	[]
20. Course of Study	[]	[]
21. Overhead Projector.	[]	[]
22. Teaching Machine.	[]	[]
23. Three Dimensional Aid	[]	[]
24. Shop or Laboratory Project.	[]	[]
25. Technical Periodical.	[]	[]

TEACHER INFORMATION FORM

THE PENNSYLVANIA STATE UNIVERSITY
Department of Vocational Education

DIRECTIONS: Indicate your answers to the following questions. Please be accurate.
The information you provide will be of much value to us.

1. Name _____
2. School _____
3. Address _____
4. Are you a full-time teacher?..... Yes No
[] []
5. Do you teach vocational-technical subjects? (i.e. machine shop, electronics, auto mechanics)..... [] []
6. Have you ever taken a course in audio-visual education?..... [] []
7. Have you or are you enrolled in a "v" course this school year?..... [] []
8. Have you ever taken a course in trade and job analysis?..... [] []
9. What is your present age?..... yrs.
10. Occupational experience in occupation you are teaching..... yrs.
11. Occupational Experience: specify kind, e.g. machinist, electrician etc. _____
12. Years of teaching experience (count this school year)..... yrs.
13. Present Position. (job title) _____
14. Kind of teaching certificate held (check one):

a. _____ None	f. _____ Master's Equivalent
b. _____ Emergency	g. _____ College Provisional
c. _____ Interim Standard	h. _____ College Permanent
d. _____ Temporary Standard	i. _____ Other (specify)
e. _____ Permanent Standard	
15. Number of undergraduate college v credits completed. Please include those credits for which you are currently enrolled.....
16. Number of undergraduate college credits, other than v credits, completed. Include those credits you are currently enrolled for.....
17. Number of graduate credits completed as a degree candidate.....

APPENDIX B

Listing of Instructional Resource Concepts

Bulletin Board

Textbook

Traditional Instructional Resources

Trade and Job Analysis

Workbook

Shop or Laboratory Project

Computer Assisted Instruction

Shop or Laboratory Equipment

Newer Instructional Resources

Technical Periodical

Chart

Three Dimensional Aid

Industrial Publication

Field Trip

Opaque Projector

Teaching Machine

16mm Motion Picture Projector

Overhead Projector

Audio-Visual Education

Automated Instruction

Programed Text

Educational Television

Chalkboard

Filmstrip

Professional Periodical

8mm Motion Picture Projector

Instruction Sheet

Educational Technology

35mm Slide Projector

Course of Study